TECHNICAL SCHEDULE III
PROPOSED PLANT DETAILS
(To be completed by the Tenderer)

1.2 Mechanical Works Mailsandra STP

Note: The bidder shall provide complete information along with product brochures in the schedule as required under the bid specifications for technical qualification**.**

1.2.1 Mechanically Raked Bar Screen – TSPS

S. No.	Description	Units	Particulars
(a)	**General**		
	(i) Make		
	(ii) Model		
	(iii) Quantity (W+S)		
	(iv) Type		
(b)	**Screen**		
	(i) Width	mm	
	(ii) Height	mm	
	(iii) Bar size (front x back x depth)	mmxm mxmm	
	(iv) Clear space between bars at front end	mm	
	(v) Type or raking arrangement		
	(vi) Raking speed	m/min	
	(vii) Motor rating	kW	
(c)	**Materials of Construction**		
	(i) Frame		
	(ii) Rake carriage		
	(iii) Screen bars		
	(iv) Tines		
	(iv) Fasteners		
	(v) Canopy		

S. No.	Description	Units	Particulars
(d)	**Belt Conveyor System**		
	(i) Material of belt		
	(ii) Width of conveyor	mm	
	(iii) Speed of conveyor	m/sec	
	(iv) Thickness of belt and ply rating		
	(v) Make of the belt		
	(vi) Motor rating	kW	
(e)	**Screw Conveyor System**		
	(i) Make		
	(ii) Material		
	(iii) Speed	rpm	
	(iv) Motor rating	kW	
(f)	**Unit Control Panel**		
	(i) Make		
	(ii) Circuit breaker rating	A	
	(iii) Over all dimensions	mm x mm x mm	
	(iv) Degree of protection		
	(v) Timer		
	• Make • Type		

1.2.2 Macerators

S. No.	Description	Units	Particulars
(a)	**General**		
	(i) Make		
	(ii) Model		
	(iii) Quantity (W+S)		
	(iv) Type		
(b)	**Ripper/Rotor Material**		
	(i) Housing/pot casings		

S. No.	Description	Units	Particulars
	(ii) Weir plate material		
	(iii) Material medium touch parts		
	(iv) Rotor Material		
	(v) Rotor knife width	mm	
	(vi) Seal		
	(vii) O rings		
(c)	**Motor Rotor details**		
	(i) Type		
	(ii) Name		
	(iii) Speed		
	(iv) Power		
	(v) Frequency		
	(vi) Motor Efficiency classification / Isolation class		
(d)	**Motor Drum details**		
	(i) Name		
	(ii) Speed		
	(iii) Power		
	(iv) Frequency		
	(v) Motor Efficiency classification / Isolation class		
(e)	**Other details**		
	(i) Diameter/size		
	(ii) Mounting		
	(iii) Support details		
(f)	**Unit Control Panel**		
	(i) Make		
	(ii) Circuit breaker rating	A	
	(iii) Over all dimensions	mm x mm x mm	

S. No.	Description	Units	Particulars
	(iv) Degree of protection		
	(v) Timer		
	• Make • Type		

1.2.3 Mechanical Medium Screen-Bar Screen

S. No.	Description	Units	Particulars	
			Stream-A	**Stream-B**
(a)	**General**			
	(i) Make			
	(ii) Model			
	(iii) Quantity (W+S)	Nos.		
	(iv) Type			
	(v) Auto jam removal system		Yes/No	Yes/No
(b)	**Screen**			
	(i) Clear Spacing	mm		
	(ii) Width	mm		
	(iii) Height	mm		
	(iv) Raking speed	m/min		
	(v) Motor rating	kW		
	(vi) Water Level	m		
(c)	**Materials of Construction** (i) Frame			
	(ii) Rake carriage			
	(iii) Screen bars			
	(iv) Fasteners			

S. No.	Description	Units	Particulars	
			Stream-A	**Stream-B**
	(v) Canopy			
(d)	**Belt Conveyor System**			
	(i) Material of belt			
	(ii) Width of conveyor	mm		
	(iii) Speed of conveyor	m/sec		
	(iv) Thickness of belt and ply rating			
	(v) Make of the belt			
	(vi) Motor rating	kW		
	(vii) Safety device			
(e)	**Screw Conveyor System**			
	(i) Make			
	(ii) Material			
	(iii) Speed	rpm		
	(iv) Motor rating	kW		
	(v) Size of screw	mm		
	(vi) Angle of screw	deg		
(f)	**Unit Control Panel** (i) Make			
	(ii) Over all dimensions	m x m x m		
	(iii) Degree of protection			
	(iv) Timer • Make • Type			

1.2.4 TSPS Pumps

S. No.	Description	Units	Particulars
(a)	**General**		
	(i) Make		
	(ii) Model		
	(iii) Type		
	(iv) Quantity (W+S)	Nos	
(b)	**Performance**		
	(i) Capacity	cum/hr	

S. No.	Description	Units	Particulars
	(ii) Total head	mlc	
	(iii) Speed	rpm	
	(iv) Overall efficiency (Pump + Motor)	%	
	(v) Motor Rating	kW	
(c)	**Materials of Construction**		
	(i) Impeller		
	(ii) Casing		
	(iii) Shaft		
	(iv) Delivery pipe and diameter		
	(v) Mechanical Seal		
	(vi) Cooling Jacket		
(d)	Weight	Kg	
(e)	Accessories and piping as specified (Provided / Not provided)		
(f)	**Testing & Inspection:**		
	(i) Pump performance testing standard		
	(ii) Maximum Noise level	dB(A)	
	(iii) Maximum velocity of vibration	mm/sec	
(g)	**Motor:**		
	(i) Make		
	(ii) Type		
	(iii) Model		
	(iv) Quantity (W+S)		
	(v) Rating	kW	
	(vi) Weight	kgs	

1.2.5 Submersible Induction Motor-TSPS Pumps

S. No.	Description	Units	Particulars
(a)	Make		
(b)	Quantity (W+S)	Nos.	
(c)	Rating	kW	
(d)	Speed	rpm	

S. No.	Description	Units	Particulars
(e)	Type of Starter		
(f)	Efficiency • Full Load • ¾ Load	 % %	
(g)	Power Factor • Full Load • ¾ Load		
(h)	Class of Insulation		
(i)	Starting method		
(j)	Temperature rise by resistance method	°C	
(k)	Type of enclosure		
(l)	Degree of protection		
(m)	Weight	kg	
(n)	Cooling arrangement for motor		
(o)	Degree of Protection		

1.2.6 Valves

S. No.	Description	Units	Particulars
(a)	**Non-return valves #**		
	(i) Make		
	(ii) Type		
	(iii) Model		
	(iv) Service		
	(v) Quantity (W+S)	Nos.	
	(vi) Size	mm	
	(vii) Rating	PN	
	(viii) Test Pressure	bar	
	(ix) Design standard		
	Material of construction:		
	(i) Body		
	(ii) Disc/plates		
	(iii) Spring		
	(iv) Shaft		
	(v) Flange drilling standard		
(b)	**Knife Gate valves :#**		

S. No.	Description	Units	Particulars
	(i) Make		
	(ii) Type		
	(iii) Model		
	(iv) Service		
	(v) Number		
	(vi) Size	mm	
	(vii) Rating	PN	
	(viii) Test pressure	bar	
	(ix) Body material		
	(x) Gate material		
	(xi) Sealing face material		
	(xii) Shaft material		
	(xiv) Gear Reducers		
	(xv) Gear Make		
	(xvi) Gear Material		
	(xvii) Flange Drilling standard		
(c)	**Knife Gate Valve Actuators #**		
	(i) Make		
	(ii) Type		
	(iii) Number		
	(iv) Motor rating	kW	
	(v) Design Torque	N-m	
	(vi) Time for full open to full close	Seconds	
(d)	**Air Valve in Pumping Main**		
	(i) Make		
	(ii) Type		
	(iii) Number	Nos	
	(iv) Size	mm	
	(v) Rating	PN	
	(vi) Test pressure	bar	
	(vii) Body material		
	(viii) Float Material		
	(ix) Nozzle Material		

1.2.7 Dewatering Pumps

S. No.	Description	Units	Particulars
(a)	(i) Make		
	(ii) Type		
	(iii) Service/Location		
	(iv) Quantity (W+S)	Nos.	
	(v) Capacity	cum/hr	
	(vi) Head	mlc	
	(vii) Efficiency	%	
	(viii) Power absorbed	kW	
	(ix) Speed	rpm	
	(x) Motor rating	kW	

1.2.8 Propeller Exhaust Fans

S. No	Description	Units	Particulars TSPS
(a)	**Fan**		
	(i) Make		
	(ii) Make		
	(iii) Model		
	(iv) Impeller diameter	mm	
	(v) Impeller speed	rpm	
	(vi) Capacity	cum/hr	
	(vii) Static pressure	mmlc	
	(viii) Shaft power	W	
	(ix) Fan total efficiency	%	
(b)	**Motor**		
	(i) Make		
	(ii) Rating	kW	
(c)	**Overall weight**	kg	

1.2.9 Mechanical Multi Rake Fine Screen

S. No.	Description	Units	Particulars	
			Stream-A	**Stream-B**
(a)	**General**			
	(i) Make			
	(ii) Model			
	(iii) Quantity (W+S)	Nos.		
	(iv) Type			
	(v) Auto jam removal system		Yes/No	Yes/No
(b)	**Screen**			
	(i) Clear Spacing	mm		

S. No.	Description	Units	Particulars	
			Stream-A	**Stream-B**
	(ii) Width	mm		
	(iii) Height	mm		
	(iv) Raking speed	m/min		
	(v) Motor rating	kW		
	(vi) Water Level	m		
(c)	**Materials of Construction** (i) Frame			
	(ii) Rake carriage			
	(iii) Screen bars			
	(iv) Fasteners			
	(v) Canopy			
(d)	**Belt Conveyor System**			
	(i) Material of belt			
	(ii) Width of conveyor	mm		
	(iii) Speed of conveyor	m/sec		
	(iv) Thickness of belt and ply rating			
	(v) Make of the belt			
	(vi) Motor rating	kW		
	(vii) Safety device			
(e)	**Screw Conveyor System**			
	(i) Make			
	(ii) Material			
	(iii) Speed	rpm		
	(iv) Motor rating	kW		
	(v) Size of screw	mm		
	(vi) Angle of screw	deg		
(f)	**Unit Control Panel**			

S. No.	Description	Units	Particulars	
			Stream-A	**Stream-B**
	(i) Make			
	(ii) Over all dimensions	m x m x m		
	(iii) Degree of protection			
	(iv) Timer • Make • Type			

1.2.10 Mechanical Step Fine Screen

S. No.	Description	Units	Particulars	
			Stream-A	**Stream-B**
(a)	**General**			
	(i) Make			
	(ii) Model			
	(iii) Quantity (W+S)	Nos.		
	(iv) Type			
(b)	**Screen**			
	Channel Width in mm	mm		
	Channel Depth in mm	mm		
	Upstream sewage water depth in mm	mm		
	Average flow / screen in MLD			
	Peak flow / screen in MLD			
	Average Bar spacing (06 mm)	mm		
	Angle of Inclination			
	Type of Operation (Motorized / Hydraulic)			
	Bar Thickness			
	Choking factor 0.5 (Yes / No)			

S. No.	Description	Units	Particulars	
			Stream-A	**Stream-B**
	Head loss through clogged screen in mm (<300 mm)			
	Velocity through clean screen at peak flow (< 1.2 m/sec)			
	Discharge height above platform (Minimum 600 mm)			
(c)	**Materials of Construction**			
	(i) Screen Bars			
	(ii) Guide Rails / Channels / Frame			
	(iii) Discharge Chute			
	(iv) Fasteners			
	(v) Control Panel (Epoxy Painted)			
(d)	**Constructional features**			
	(i) Outside Screen width in mm			
	(ii) Inside Screen width in mm			
	(iii) Max. inclined length of screen in mm			
(e)	**Screen Accessories**			
	(i) Upstream type ultrasonic level switch (Yes / No)			
	(ii) Belt Conveyor (Yes / No). If yes, specify size			
	(iii) Collection Bin / Waste Bin (Yes / No)			
	(iv) First Fill of Lubricant for Hydraulic Power Pack			
	(v) Cables (Yes / no)			
(f)	**Shop Testing**			
	(i) Dimensional check			

S. No.	Description	Units	Particulars	
			Stream-A	**Stream-B**
	(ii) Operational test			
	(iii) PMI test			
	(iv) Dye Penetration Test			
	(v) Review of test certificates			
	(vi) Review of welding WPS, PQR & Welder qualification			
(f)	**Unit Control Panel** (i) Make			
	(ii) Over all dimensions	m x m x m		
	(iii) Degree of protection Control Panel protection IP 65 approved by CPRI			
	(iv) Timer • Make • Type			

1.2.11 Vortex Type Grit Removing Equipment

S. No.	Description	Units	Particulars
1	Manufacturer		
2	Country of origin		
3	Type & Model		Vortex grit mechanism
4	No. of units	Nos	
5	Design flow for each Unit		
	Minimum		
	Maximum		
	Design		
6	Grit design Load	m3/ month	
7	Settled grit specific gravity		2.65
8	Guaranteed removal rate for > 0.105 mm (105 micron) in size	%	>95%

S. No.	Description	Units	Particulars
9	Turndown Ratio of grit chamber (for 95% of 0.105 mm grit removal)		
	Grit chamber		
1	Degree of Grit Chamber		360
2	Dia of Upper Chamber	mm	
3	Upper Chamber Depth	mm	
4	Dia of Lower Chamber	mm	
5	Lower Chamber Depth	mm	
6	Inlet & effluent channel width	mm	
7	Total Depth	mm	
8	Grit Hopper Storage Volume	m^3	
9	MOC of main internals under water		
10	**Head loss across the grit mechanism**		
	Minimum		
	Maximum		
	Design		
11	**Upstream Velocity**		
	Minimum		
	Maximum		
	Design		
A	**Vortex Drive Motor**		
1	Manufacturer		
2	Country of origin		
3	No. of units		
4	Type		
5	Power	kW	
6	Rotary speed of output shaft	rpm	
7	Rotary speed of motor shaft	rpm	
8	Efficiency at duty point	%	
9	Total efficiency pump and motor	%	
10	Degree of protection	IP	
11	Weight per unit	kg	
12	Protections needed		
13	Weight per unit	kg	
B	**Grit Pump**		

S. No.	Description	Units	Particulars
1	Manufacturer		
2	Country of origin		
3	No. of units	Nos	
4	Store Standby		
5	Type : Flooded Suction / Top Mounted		
6	Capacity of the pump	m^3/h	
7	Delivery head (after all losses - bends & horizontal piping)	m WC	
8	Efficiency	%	
9	Power demand at shaft	kW	
10	Solids handling	mm	
11	Weight per unit	kg	
Material			
1	Pump housing		
2	Motor housing		
3	Propeller hub		
4	Impeller		
5	Shaft		
6	Shaft seal pump side		
7	Shaft seal motor side		
8	Impeller type		
Motor			
1	Manufacturer		
2	Country of origin		
3	No. of units	Nos	
4	Type		
5	Nominal power	kW	
6	Efficiency at duty point	%	
7	Total efficiency pump and motor	%	
8	Degree of protection	IP	
9	Weight per unit	kg	
10	Protections needed		
C	**Grit Classifier**		
1	Manufacturer		
2	Country of origin		
3	No. of units	No.	
4	Type		
5	Throughput capacity	m^3/h	

S. No.	Description	Units	Particulars
6	Dryness of the grit	%	
7	Sand output rate	m^3/h	
8	Organic content in the final dewatered grit (from the outlet of grit classifier)	%	
9	Weight of the Unit	Kgs	
Dimensions			
1	Total height	mm	
2	Total length	mm	
3	Height of sand discharge	mm	
4	Height of tank	mm	
5	Width of tank	mm	
6	Inclination of spiral	Deg	
Materials			
1	Tank		
2	Covers		
3	Spiral		
4	Wear rails		
D	**Grit Container**		
1	Length	mm	
2	Width	mm	
3	Volume	M3	
4	MOC		
5	Quantity	Nos	
Motor			
1	Manufacturer		
2	Country of origin		
3	No. of units	Nos	
4	Type		
5	Nominal power	kW	
6	Efficiency at nom. point		
7	Motor input speed	rpm	
8	Motor output speed	rpm	
9	Degree of protection	IP	
10	Starting method		
11	Ex. classification		
12	Weight per unit	kg	
13	Protections needed		
List of Documents to be provided by vendor			
1	Completely filled data Sheets		

S. No.	Description	Units	Particulars
2	Process Design Basis and treatment Philosophy - Vortex grit chamber and Grit classifier		
3	**Documentary Evidence for :** Successful Installations of Min. 5 Nos of vortex grit removal Units for the peak flow offered as per this tender, shall be furnished by the manufacturer along with full scale field test results / reports for each Installation performed by qualified personnel having at least 3 years' experience in performing the test, proving the ability to achieve the tender specified efficiency.		
4	Deviations List (if any deviations considered)		

1.2.12 Air Blower for Vortex Type Grit Removing Equipment

S. No.	Description	Units	Particulars
(a)	**General**		
	(i) Make		
	(ii) Type		
	(iii) Quantity (W+S)	Nos.	
	(iv) Capacity at NTP	m^3/min	
	(v) Design maximum discharge pressure	mlc	
	(vi) Efficiency	%	
	(vii) Speed, blower	rpm	
	(viii) Absorbed power	kW	
	(ix) Motor rating	kW	
	(x) Speed, motor	rpm	
	(xi) Noise level at Duty Point in dB(A) at 1.86 m from the unit	dB(A)	
	(xii) Vibration	mm/sec	
	(xiii) With Acoustic Hood	dB(A)	
	(xiv) Without Acoustic Hood	dB(A)	
	(xv) Weight – Blower	kgs	

S. No.	Description	Units	Particulars
	(xvi) Maximum lifting weight	kgs	
	(xvii) Dimensions (L x W x H)	m x m x m	
	(xviii) Coupling Type		
	(xix) Coupling Make		
	(xx) Cooling System		
(b)	**Material of construction:**		
	(i) Casing		
	(ii) Impeller		
	(iii) Shaft		
	(iv) Common Base frame		
	(v) Orientation		
(c)	**Acoustic Hood:**		
	(i) Type		
	(ii) Material of Construction		
(d)	**Inlet/Outlet silencer**		
	(i) Type		
	(ii) Make		
	(iii) Filter media		
	(iv) Mean air velocity	m/s	
(e)	**Noise reduction (mean) Air release valves**		
	(i) Number	Nos.	
	(ii) Diameter	mm	
	(iii) Type		
	(iv) Set pressure	bar	
	(v) Make		
(f)	**Delivery non-return valves**		
	(i) Number	Nos.	
	(ii) Diameter	mm	
	(iii) Type		
	(iv) Make		
(g)	**Delivery isolation valves**		
	(i) Number	Nos.	
	(ii) Diameter	mm	
	(iii) Type		
	(iv) Make		
(h)	**Delivery Expansion bellows**		
	(i) Number	Nos.	
	(ii) Diameter	mm	
	(iii) Type		
	(iv) Make		

1.2.13 Clarifiers (Circular)

S. No.	Description	Units	Particulars
(A)	**Primary Clarifiers**		
(a)	**General**		
	(i) Number		
	(ii) Flow per clarifier	cum/hr	
	(iii) Up flow rate	m/h	
	(iv) Length x Width	m x m	
	(v) Liquid depth each	m	
	(vi) Free board	m	
	(vii) Volume	cum	
(b)	**Scraping mechanism:**		
	(i) Make		
	(ii) Type		
	(iii) Size (Diameter x SWD x FB)	m	
	(iv) Scraper speed	rpm	
	(v) Peripheral velocity	m/sec	
	(vi) Design Torque	N-m	
	(vii) Weir plate size(Thick x width)	mm	
	(viii) Safety device		
(c)	**Tube Settler**		
	(i) Make		
	(ii) Type of tubes		
	(iii) Size/Cross-Sectional Area of tubes	mm x mm	
	(iv) Number of tubes per clarifier	Nos.	
	(v) MOC of tubes		
	(vi) UV Protection		Yes/No
	(vii) Length of the tube & Thickness of the tube	m	
	(viii) Degree of Inclination	degree	
	(ix) MOC of Supporting Structure		
(c)	**Speed reduction drive**		
	(i) Make		
	(ii) Type		
	(iii) Speed reduction ratio		
	(iv) Torque		

S. No.	Description	Units	Particulars
	(v) Lubrication type		
(d)	**Surface preparation & Protection:**		
	(i) Wetted parts		
	(ii) Exposed parts		
(e)	**Material of construction:**		
	(i) Bridge and Superstructure		
	(ii) Feed well		
	(iii) Walkway Chequered Plates		
	(iv) Squeegees		
	(v) Weir plate		
	(vi) Clamps & Hardware		
(f)	**Motor:**		
	(i) Motor rating	kW	
	(ii) Motor speed	rpm	
	(iii) Motor Make		
	(iv) Protection		
(B)	**Secondary Clarifiers**		
(a)	**General**		
	(i) Number		
	(ii) Flow per clarifier	cum/hr	
	(iii) Diameter	M	
	(iv) Up flow rate	m/h	
	(v) Liquid depth each	M	
	(vi) Free board	M	
	(vii) Volume	Cum	
	(vii) Safety device		
(b)	**Scraping mechanism:**		
	(i) Make		
	(ii) Type		
	(iii) Size (Diameter x SWD x FB)	m x m x m	
	(iv) Scraper speed	rpm	
	(v) Peripheral velocity	m/sec	
	(vi) Torque rating	N-m	
	(vii) Feed rate per Clarifier	cum/hr	
	(viii) Feed well size	Mm	
	(ix) Walkway (width x Height)	Mm	
	(x) Weir plate size (Thick x width)	Mm	

S. No.	Description	Units	Particulars
(c)	**Speed Reduction Drive**		
	(i) Make		
	(ii) Type		
	(iii) Speed Reduction Ratio		
	(iv) Torque		
	(v) Lubrication Type		
(d)	**Surface preparation & Protection:**		
	(i) Wetted parts		
	(ii) Exposed parts		
(e)	**Material of construction:**		
	(i) Bridge and Superstructure		
	(ii) Feed well		
	(iii) Walkway Chequered Plates		
	(iv) Squeegees		
	(v) Weir plate		
	(vi) Clamps & Hardware		
(f)	**Motor:**		
	(i) Motor rating	kW	
	(ii) Motor speed	Rpm	
	(iii) Motor Make		
	(iv) Protection		

1.2.14 Collector Mechanism for Primary Sedimentation Tank

S. No.	Description		Units	Particulars
(a)	**General**			
	(i) Make			
	(i) Model			
	(iii) Type			
	(iv) Total Sludge Collector Mechanism		No.s	
(b)	Collector scrapping width		m	
	Tank Length			
	Sprockets per collector		No.s	
	Flight Speed		min	

S. No.	Description		Units	Particulars
	Flight Spacing - Longitudinal		m	
	Sludge load (Average)		(Kg/ m)	
	Friction Factors			
	Bearing Friction factors			
(c)	**Skimming equipment**			
	MOC			
	Type			
	Quantity			
(d)	**Materials of Construction**			
	Flight Carry Chain			
	Drive chain			
	Flights			
	Wear Shoes			
	Wear Strips			
	Return Tracks			
	Deflector Angles			
	Shafting			
	Collector Bearings			
	Collector Sprockets			
	Drive Sprocket			
	Driven Sprocket			
	Bolts and anchor bolts			
	Collector Chain			
	Skimming equipment and scum pipes			
	Quality Assurance			
	Collector Chain Quality Control			

S. No.	Description		Units	Particulars
	1. The Collector chain manufacturer shall submit previously certified design documentation stating that collector chain has been tested on an endurance testing apparatus at a minimum load of 8 kN and that the flight attachment link has been tested to a minimum 15 degrees of twist. Collector chain and attachment links that do not meet these requirements shall not be allowed **2. Certified documentation shall be submitted with the bid stating the manufacturer of the collector chain has an established quality control program for material and manufacture. The program consists of proof load and ultimate tensile strength tests.**			

1.2.15 Collector Mechanism for Secondary Sedimentation Tank

S. No.	Description	Units	Particulars
(a)	**General**		
	(i) Make		
	(ii) Model		
	(iii) Type		

S. No.	Description	Units	Particulars
	(iv) Total Sludge Collector Mechanism	No.s	
(b)	Collector scrapping width	m	
	Tank Length		
	Sprockets per collector	No.s	
	Flight Speed	min	
	Flight Spacing - Longitudinal	m	
	Sludge load (Average)	(Kg/m)	
	Friction Factors		
	Bearing Friction factors		
	Speed Reducer and Motors		
(c)	**Skimming equipment**		
	MOC		
	Type		
	Quantity		
(d)	**Materials of Construction**		
	Flight Carry Chain		
	Drive chain		
	Flights		
	Wear Shoes		
	Wear Strips		
	Return Tracks		
	Deflector Angles		
	Shafting		
	Collector Bearings		
	Collector Sprockets		
	Drive Sprocket		
	Driven Sprocket		
	Bolts and anchor bolts		
	Collector Chain		
	Skimming equipment and scum pipes		

S. No.	Description	Units	Particulars
	Quality Assurance		
	Collector Chain Quality Control		
	1.The Collector chain manufacturer shall submit previously certified design documentation stating that collector chain has been tested on an endurance testing apparatus at a minimum load of 8 kN and that the flight attachment link has been tested to a minimum 15 degreesof twist. Collector chain and attachment links that do not meet these requirements shall not be allowed **2. Certified documentation shall be submitted with the bid stating the manufacturer of the collector chain has an established quality control program for material and manufacture. The program consists of proof load and ultimate tensile strength tests.**		

1.2.16 Primary Sludge Pump set

S. No.	Description	Units	Particulars
(a)	**General**		
	(i) Make		
	(ii) Model		
	(iii) Type		
	(iv) Quantity (W+S)	Nos	
(b)	**Performance**		
	(i) Capacity	cum/hr	
	(ii) Total head	mlc	
	(iii) Speed	rpm	
	(iv) Overall efficiency (Pump + Motor)	%	
	(v) Motor Rating	kW	
(c)	**Materials of Construction**		
	(i) Casing		
	(ii) Rotor		
	(iii) Stator		
	(iv) Line Shaft		
	(v) Mechanical Seal		
	(vi) Base Plate		
	(vii) Delivery pipe and diameter		
(d)	Weight	Kgs	
(e)	**Testing & Inspection:**		
	(i) Pump performance testing standard		
	(ii) Maximum Noise level	dB(A)	
	(iii) Maximum velocity of vibration	mm/sec	

1.2.17 Scum Pump set

S. No.	Description	Units	Particulars	
			Primary	**Secondary**
(a)	**General**			
	(i) Make			
	(ii) Model			
	(iii) Type			
	(iv) Quantity (W+S)	Nos		
(b)	**Performance**			
	(i) Capacity	cum/ hr		
	(ii) Total head	mlc		
	(iii) Speed	rpm		
	(iv) Overall efficiency (Pump + Motor)	%		
	(v) Motor Rating	kW		
(c)	**Materials of Construction**			
	(i) Casing			
	(ii) Impeller			
	(iii) Shaft			
	(iv) Mechanical Seal			
	(v) Lifting Chain and Guide Bar			
	(vi) Delivery pipe and diameter			
	(vii) Cooling Jacket			
(d)	Weight	Kgs		
(e)	**Testing & Inspection:**			
	(i) Pump performance testing standard			
	(ii) Maximum Noise level	dB(A)		
	(iii) Maximum velocity of vibration	mm/ sec		

1.2.18 Submersible Mixer

S. No.	Description	Units	Particulars		
			Anaerobic DeaerationZone	**Anoxic Zone-1**	**Anoxic Zone-2**
(a)	**Submersible Mixer**				
	(i) Make				
	(ii) Type				
	(iii) Model				
	(iv) Quantity (W+S)	Nos.			
(b)	**Material of construction**				
	(i) Casing				
	(ii) Impeller				
	(iii) Shaft				
	(iv) Mechanical seal				
	(v) Guide mechanism with winch				
	(vi) Wire Rope				
	(vii) Lifting Davit				
(c)	**Design/ Construction features**				
	(i) Impeller Diameter	mm			
	(ii) Rotation speed	rpm			
	(iii) Immersion depth	mm			
	(iv) Absorbed power	kW			
	(v) Motor rating	kW			
	(vi) Maximum Lifting weight	kgs			

1.2.19 Fine Bubble Air Diffusers

S. No.	Description	Units	Particulars
(a)	**General**		
	(i) Make		
	(ii) Model		
	(iii) Type		
	(iv) Diffuser OD x Length	mm x mm	
	(v) Aeration/SBR Basin Dimensions (L x W x SWD)	mm x mm	
	(vi) Design Air-Flow per Aeration/SBR Basin (Maximum/Average)	Nm^3/hr	
	(vii) Quantity per Aeration/SBR Basin	No.	
	(viii) Quantity in Aeration Basin Zone 1/Zone 2/...	No.	
	(ix) Weight per Diffuser	Kg	
	(x) Design air flow per diffuser	m^3/hr	
	(xi) Efficiency per diffuser	%	
(b)	**Diffuser Membrane**		
	(i) Type-self-cleaning (Yes/No)		
	(ii) No. of Membranes - Total	No.	
	(iii) Membrane Material		
	(iv) Means of attachment		
	(v) Membrane OD X Length	mm x mm	
	(vi) Pore size (Average)	mm	
	(vii) No. of Pores per length of Diffuser	No./m	
	(viii) Bubble size (Avg)	mm	
(c)	**Diffuser Assembly**		
	(i) Make		

S. No.	Description	Units	Particulars
	(ii) Type		
	(iii) Length x Width	mm x mm	
	(iv) Material of Construction		
	(v) Coupling Type • Make • Model/Size		
	(vi) Diffuser Assembly Weight	Kg	
(d)	**Materials of Construction**		
	(i) Diffuser Tube		
	(ii) Membrane		
	(iii) Pipe clamps & Hardware		
	(iv) Pipe Grid		
(e)	**Performance**		
	(i) SOTE Oxygen transfer rate • Clear water • Field	%	
	(ii) Zone of influence	m	
	(iii) Zone of oxygenation	m	
	(iv) Depth of mixing	m	
	(v) Velocity thro' the Diffuser	m/sec	
	- Diffuser Head loss & Efficiency V/s - Submergence Curve attached Diffuser Grid Drawing with retrievable arrangement details attached	Yes/No Yes/No	

1.2.20 Process Air Blowers

S. No.	Description	Units	Particulars
(a)	**General**		
	(i) Make		
	(ii) Type		
	(iii) Quantity (W+S)	Nos.	
	(iv) Capacity at NTP	m^3/min	
	(v) Design maximum discharge pressure	mlc	
	(vi) Efficiency	%	
	(vii) Speed, blower	rpm	
	(viii) Absorbed power	kW	
	(ix) Motor rating	kW	
	(x) Speed, motor	rpm	
	(xi) Noise level at Duty Point in dB(A) at 1.86 m from the unit	dB(A)	
	(xii) Vibration	mm/sec	
	(xiii) With Acoustic Hood	dB(A)	
	(xiv) Without Acoustic Hood	dB(A)	
	(xv) Weight – Blower	kgs	
	(xvi) Maximum lifting weight	kgs	
	(xvii) Dimensions (L x W x H)	m x m x m	
	(xviii) Coupling Type		
	(xix) Coupling Make		
	(xx) Cooling System		
(b)	**Material of construction:**		
	(i) Casing		
	(ii) Impeller		
	(iii) Shaft		
	(iv) Common Base frame		
	(v) Orientation		
(c)	**Acoustic Hood:**		
	(i) Type		
	(ii) Material of Construction		
(d)	**Inlet/Outlet silencer**		
	(i) Type		
	(ii) Make		
	(iii) Filter media		
	(iv) Mean air velocity	m/s	
(e)	**Noise reduction (mean) Air release valves**		
	(i) Number	Nos.	
	(ii) Diameter	mm	

S. No.	Description	Units	Particulars
	(iii) Type		
	(iv) Set pressure	bar	
	(v) Make		
(f)	**Delivery non-return valves**		
	(i) Number	Nos.	
	(ii) Diameter	mm	
	(iii) Type		
	(iv) Make		
(g)	**Delivery isolation valves**		
	(i) Number	Nos.	
	(ii) Diameter	mm	
	(iii) Type		
	(iv) Make		

1.2.21 Induction Motor for Process Air Blowers

Sr. No.	Description	Unit	Particulars
(a)	Make		
(b)	Type Designation		
(c)	Rating	kW	
(d)	Particulars at rated voltage and frequency:		
(i)	Starting time	Sec.	
(ii)	Starting current	% FL	
(iii)	Pull-out torque	% FLT	
(iv)	Pull-up torque	% FLT	

Sr. No.	Description	Unit	Particulars
(e)	Minimum voltage required under starting conditions to accelerate driven equipment to rated speed.	Volts	
(f)	Starting time at specified minimum starting voltage	Sec.	
(g)	Permissible running time at full load at minimum allowable voltage	Min.	
(h)	Locked rotor current withstand time (safe stall time) at 110% rated voltage		
(i)	At rated temp. (Hot)	Sec.	
(ii)	When cold	Sec.	
(i)	Stator thermal time constant	Sec.	
(j) (i)	Permissible no. of equally spread starts per hour under normal service conditions	No.	
(ii)	Permissible no. of starts in quick succession with cold machine at room temperature	No.	
(iii)	Permissible no. of hot restarts	No.	
(iv)	Starts per 8-hour period and 24-hour period	No.	
(k)	Space Heaters:		
(i)	Rated voltage, no. and location	Volts	
(ii)	Rating (Total)	KW	
(l)	Terminal box:		
(i)	Fault withstand capacity at rated voltage and duration	MVA for Secs.	

Sr. No.	Description	Unit	Particulars
(m)	Insulation treatment		
(n)	**Embedded temperature detectors**		
(i)	Make & Type		
(ii)	Number		
(iii)	Resistance at 0° C	Ohm	
(o)	**Efficiency**		
(i)	Full Load		
(ii)	¾ Load		
(iii)	½ Load		
(iv)	At duty point		
(p)	**Power factor**		
(i)	Full Load		
(ii)	¾ Load		
(iii)	½ load		
(q)	Total guaranteed losses comprising iron loss, copper loss, friction, windage and stray losses	kW	
(i)	Break up : Iron loss	kW	
(ii)	Copper loss	kW	
(iii)	Friction, windage and stray losses	kW	
(r)	**Motor bearings**		
(i)	Permissible temperature rise for bearings	^{O} C	
(ii)	Design ambient temperature assumed for above	^{O} C	
(s)	Motor bearing lubrication system self-lubrication / forced oil lubrication		
(t)	**Stator core temperature detectors**		
(i)	Type and Make		
(ii)	Number		
(iii)	Resistance at 0° C	Ohm	

Sr. No.	Description	Unit	Particulars
(u)	Permissible vibraton limits	mm/sec	
(v)	Wr^2 Value	kg-m^2	
(w)	Weight	Kg	

1.2.22 Mixed Liquor Recycle Pump set (Internal Recycle Pumps)

S. No.	Description	Units	Particulars
(a)	**General**		
	(i) Make		
	(ii) Model		
	(iii) Type		
	(iv) Quantity (W+S)	No.s	
	(v) Tubular Installation		Yes/No
(b)	**Performance**		
	(i) Capacity	cu.m/hr	
	(ii) Total head	mlc	
	(iii) Speed	rpm	
	(iv) Overall efficiency (Pump + Motor)	%	
	(v) Motor Rating	kW	
(c)	**Materials of Construction**		
	(i) Impeller		
	(ii) Casing		
	(iii) Shaft		
	(iv) Mechanical seal		
	(v) Delivery pipe and diameter		
	(vi) Guide wire/rope & Lifting Chain		
	(vii) Dia of the tube/pipe & MOC		
(d)	Weight	Kg	

S. No.	Description	Units	Particulars
(e)	Accessories as specified (Provided / Not provided)		
(f)	Testing & Inspection:		
	(i) Pump performance testing standard		
	(ii) Maximum Noise level	dB(A)	
	(iii) Maximum velocity of vibration	mm/sec	

1.2.23 RAS Pump set

S. No.	Description	Units	Particulars
(a)	**General**		
	(i) Make		
	(ii) Model		
	(iii) Type		
	(iv) Quantity (W+S)	No.s	
(b)	**Performance**		
	(i) Capacity	cu.m/hr	
	(ii) Total head	mlc	
	(iii) Speed	rpm	
	(iv) Overall efficiency (Pump + Motor)	%	
	(v) Motor Rating	kW	
(c)	**Materials of Construction**		
	(i) Impeller		
	(ii) Casing		
	(iii) Shaft		
	(iv) Delivery pipe and diameter		
	(v) Mechanical Seal		
	(vi) Cooling Jacket		
(d)	Weight	Kg	
(e)	Accessories and piping as specified (Provided / Not provided)		
(f)	**Testing & Inspection:**		

S. No.	Description	Units	Particulars
	(i) Pump performance testing standard		
	(ii) Maximum Noise level	dB(A)	
	(iii) Maximum velocity of vibration	mm/sec	
(g)	**Motor:**		
	(i) Make		
	(ii) Type		
	(iii) Model		
	(iv) Quantity (W+S)		
	(v) Rating	kW	
	(vi) Weight	kgs	

1.2.24 Alum Dosing Pumps

S. No.	Description	Units	Particulars
(a)	**Pumps**		
	(i) Make		
	(ii) Type		
	(iii) Quantity (W+S)		
	(iv) Model		
	(v) Capacity max/min	l/s	
	(vi) Head	mlc	
	(vii) Stroke adjustment	mm	
	(viii) Stroking speed max/min	spm	
	(ix) Casing material		
	(x) Diaphragm material		
	(xi) Shaft material		
	(xiii) Motor rating	kW	
	(xiv) Motor Make		
(b)	**Alum preparation Tank:**		
	(i) Make		
	(ii) Model		
	(iii) Quantity (W+S)	nos	
	(iv) Size (Diameter x Height)	m x m	
	(v) Material of construction		
(c)	**Alum solution mixer**:		

S. No.	Description	Units	Particulars
	(i) Make		
	(ii) Model		
	(iii) Type		
	(iv) Quantity (W+S)	nos	
	(v) Motor rating	kW	
	(vi) Motor speed	rpm	
	(vii) Mixer speed	rpm	
	(viii) Impeller material		
	(ix) Shaft material		

1.2.25 Poly Electrolyte Dosing Pumps

S. No.	Description	Units	Particulars
(a)	**Pumps**		
	(i) Make		
	(ii) Type		
	(iii) Quantity (W+S)	nos	
	(iv) Model		
	(v) Capacity max/min	l/s	
	(vi) Head	mlc	
	(vii) Stroke adjustment	mm	
	(viii) Stroking speed max/min	spm	
	(ix) Casing material		
	(x) Diaphragm material		
	(xi) Shaft material		
	(xiii) Motor rating	kW	
	(xiv) Motor Make		
(b)	**Polyelectrolyte preparation Tank:**		
	(i) Make		
	(ii) Model		
	(iii) Quantity (W+S)		
	(iv) Size (Diameter x Height)	m x m	
	(v) Material of construction		
(c)	**Poly solution Agitator**		
	(i) Make		
	(ii) Model		
	(iii) Type		
	(iv) Quantity (W+S)		
	(v) Motor rating	kW	
	(vi) Motor speed	rpm	
	(vii) Mixer speed	rpm	

	(viii) Impeller material		
	(ix) Shaft material		
	(x) Solids recovery		

1.2.26 Disc Cloth Filter

S. No.	Description	Units	Particulars
(a)	i) Total Peak flow		
	ii) Disc model / quantity		
	iii) Maximum solid inlet concentration	mg/l	
	iv) Maximum solid outlet concentration	mg/l	
	v) Mesh size		
	vi) Disc Area (Each Disc)	m2	
	vii) Model number		
	viii) Flow per disc	m3/hr	
	ix) Quantity	nos	
	x) Number of Discs	nos	
	xi) Disc Diameter	mm	
	xii) Screening Outlet level	mm	
	xiii) Maximum water level at inlet	mm	
	xiv) Total width	mm	
	xv) Total height	mm	
	xvi) Total length	mm	
	xvii) Dry Weight	kg	
	xviii) Concrete structure length, width and height	mm	
	xix) Make		
(b)	**Screen Drive**		
	i) Drive type		
	ii)Power	KW	
	iii)Voltage	V	
	iv)Frequency	Hz	
	v)Nominal current	A	
	vi)Rotational Speed	rpm	
	vii)Make		
	viii)Protection rade		
	ix)Gear		
	x)No of pumps per machine	nos	
	xi) Max Delivery	m3/hr	
	x)Pressure	mwc	
	xi)Accessories supplied		

1.2.27 Chlorination System

S. No.	Description	Units	Particulars
(a)	**Automatic Changeover Device**		
	(i) Make		
	(ii) Type		
	(iii) Quantity (W+S)		
	(iv) Model		
(b)	**Chlorinator**		
	(i) Make		
	(ii) Type		
	(iii) Quantity (W+S)		
	(iv) Model		
	(v) Max capacity	kg/hr	
	(vi) Min Capacity	kg/hr	
	(vii) Accuracy as a percent of actual rate in the operating range	±%	
	(viii) Details of Instruments mounted		
	(ix) Cabinet Material		
(c)	**Chlorine load Cell (weighing scale)**		
	(i) Make		
	(ii) Type		
	(iii) Range		
	(iv) Quantity (W+S)		
(d)	**Chlorine leak detector**		
	(i) Make		
	(ii) Type		
	(iii) Range		
	(iv) Quantity (W+S)		
	(v) Location		
	(vi) Adjustable range of Alarm		
	(vii) State whether separate alarms for leak detection and leak detector equipment failure are provided		
(e)	**Chlorine Tonners and Roller supports**		
	(i) Make		
	(ii) Type		
	(iii) Quantity (W+S) - Chlorine tonners	Nos	

S. No.	Description	Units	Particulars
	- Roller supports		
	(iv) Tonner capacity	Kgs	
	(v) Material of construction:		
	Body		
	Rollers		
	Bush		
(f)	**Liquid Chlorine Pipe work, valves and fittings:**		
	(i) Make		
	(ii) Type		
	(iii) Quantity (W+S)	nos	
	(iv) Rating		
(g)	**Material of construction:**		
	(i) Pipe		
	(ii) Fittings		
	(iii) Valves		
	(iv) Type		
	(v) Body		
	(vi) Shaft		
	(vii) Plug/Disc/Diaphragm		
(h)	**Valve Actuator:**		
	(i) Make		
	(ii) Type		
	(iii) Model		
(i)	**Pressure Gauges:**		
	(i) Make		
	(ii) Type		
	(iii) Range		
(j)	**Gas Chlorine Pipe work, valves and fittings:**		
	(i) Make		
	(ii) Type		
	(iii) Quantity (W+S)		
	(iv) Rating		
(k)	**Material of construction:**		
	(i) Pipe		
	(ii) Fittings		
	(iii) Valves		
	(iv) Type		
	(v) Quantity		
	(vi) Body		
	(vii) Shaft		
	(viii Plug/Disc/Diaphragm		

S. No.	Description	Units	Particulars
	)		
(l)	**Valve Actuator:**		
	(i) Make		
	(ii) Type		
	(iii) Quantity (W+S)	nos	
	(iv) Model		
(m)	**Pressure Gauges:**		
	(i) Make		
	(ii) Type		
	(iii) Range		
(n)	**Chlorine Ejectors:**		
	(i) Make		
	(ii) Type		
	(iii) Quantity (W+S)	nos	
	(iv) Model	Nos.	
	(v) Rating		
	(vi) Material of construction:		
	(vii) End connections		
(o)	**Tonner lifting Beam with Hooks**		
	(i) Make		
	(ii) Quantity (W+S)		
	(iii) Material of construction		
(p)	**Chlorine Tonner weighing equipment**		
	(i) Make		
	(ii) Type		
	(iii) Quantity (W+S)		
	(iv) Range		
	(v) Accuracy		
(q)	**Safety Equipment:**		
	(i) Make:		
	(ii) Quantity:		
	(iii) Type:		
	(iv) Self-contained breathing apparatus quantity		
	(v) Positive air-line breathing apparatus quantity		
	(vi) Instant action resuscitators quantity		
	(vii) Safety clothing complete set quantity		
	(viii) Emergency showers quantity		

S. No.	Description	Units	Particulars
	(ix) Eye Baths quantity		
	(x) Portable compressor, recharging cylinder, quick release coupling complete set quantity		
(r)	**Chlorine Gas scrubber:**		
	(i) Make		
	(ii) Type		
	(iii) Model		
	(iv) Quantity (W+S)		
	(v) MOC of Tower		
	(vi) Weight	kg	
	(vii) Capacity	Kgs	
	(viii) Caustic pumps capacity/head	Cum/ hr/m	
	(ix) Type & Make		
	(x) Motor Rating	kW	
	(xi) MOC of Caustic Pumps		
	- Casing		
	- Impeller		
	- Shaft		
	(xii) Blowers capacity/pressure	Cum/ hr/ bar	
	(xiii) Type & Make		
	(xiv) MOC of Blowers		
	- Casing		
	- Impeller		
	- Shaft		
	(xv) Agitator in the tank		Yes/No
	(xvi) Type & Make		
	(xvii) MOC of agitator		
	(xviii) Motor Rating	kW	
(s)	**Auto Shutoff Valve- for all Chlorine Tonner**		
	(i) Make		
	(ii) Type		
	(iii) Model		
	(iv) Quantity (W+S)	Nos	
	(v) Operating Media		
	(vi) Battery Back up	Hrs	
	(vii) Closing time	sec	
	Air Compressor		
	(i) Make		

S. No.	Description	Units	Particulars
	(ii) Type		
	(iii) Model		
	(iv) Quantity (W+S)		
	(v) Speed	RPM	
	(vi) Air flow required	CFM	
	(vii) Air pressure required	BAR	
	(viii) Max Torque	NM	
	Accessories for Auto shutoff valve details		
	(i) Compressor		
	(ii) Air Motor		
	(iii) Solenoid Valve		
	(iv) Filter Regulator combination-Lubricator		
	(v) Clamp		
	(vi) Inter connecting piping/valve		
	(vii) Hooter		
	(viii) PLC based control panel		

1.2.28 Chlorine Booster Pump

S. No.	Description	Units	Particulars
(a)	**General**		
	(i) Make		
	(ii) Model		
	(iii) Type		
	(iv) Quantity (W+S)	Nos.	
(b)	**Performance**		
	(i) Capacity	cum/hr	
	(ii) Total head	mlc	
	(iii) Speed	rpm	
	(iv) Overall efficiency (Pump + Motor)	%	
	(v) Motor Rating	kW	

S. No.	Description	Units	Particulars
(c)	**Materials of Construction**		
	(i) Casing		
	(ii) Impeller		
	(iii) Shaft		
	(iv) Shaft Sleeve		
	(v) Mechanical Seal		
	(vi) Base Plate		
	(vii) Delivery pipe and diameter		
(d)	Weight	Kgs	
(e)	**Testing & Inspection:**		
	(i) Pump performance testing standard		
	(ii) Maximum Noise level	dB(A)	
	(iii) Maximum velocity of vibration	mm/sec	

1.2.29 Chlorine Building Ventilation

S. No.	Description	Units	Particulars
(a)	**Chlorine cylinder room**		
	Exhaust fans:		
	(i) Make		
	(ii) Model		
	(iii) Quantity(W+S)		
	(iv) Capacity	m^3/s	
	(v) Speed	rpm	
	(vi) Motor rating	kW	
(b)	**Ducting:**		
	(i) Standard		
	(ii) Type		
	(iii) Dimension	m x m	
	(iv) Material		
(c)	**Chlorinator Room:**		
	(i) Exhaust fans		
	(ii) Make		
	(iii) Model		
	(iv) Quantity (W+S)		
	(v) Capacity	m^3/s	

S. No.	Description	Units	Particulars
	(vi) Speed	rpm	
	(vii) Motor rating	kW	
(d)	**Ducting:**		
	(i) Standard		
	(ii) Type		
	(iii) Dimension	m x m	
	(iv) Material		

1.2.30 EOT Crane

S. No.	Description	Units	Particulars		
(a)	**EOT Crane**		**TSPS**	**Chlorination building**	**Process Air Blower Room**
	(i) Make				
	(ii) Type and class				
	(iii) Safe working Load	tonne			
	(iv) Hoist speed high/low	m/min			
	(v) Long Travel speed	m/min			
	(vi) Cross travel speed	m/min			
	(vii) Span	m			
(b)	**Hoisting Rope:**				
	(i) Diameter	mm			
	(ii) Construction				
	(iii) Quality of steel				
	(iv) Minimum Breaking Load	kgs			
	(v) Factor of safety				
(c)	**Motors for Hoist/Long travel/cross travel:**				
	(i) Make				
	(ii) Type				

S. No.	Description	Units	Particulars		
	(iii) Rating	kW			
(d)	**Details of Brakes for Hoist/cross travel/Long travel:**				
	(i) Make				
	(ii) Design Holding Torque	N-mm			
	(iii) Net weight	kgs			

1.2.31 Electric Hoist

S. No.	Description	Units	Particulars			
(a)	**Electric Hoist**		**RAS / WAS Pump house**	**Thickener feed Pump**	**Centrifuge**	**Internal Recycle pumps**
	(i) Make					
	(ii) Type and class					
	(iii) working Load	tonne				
	(iv) Hoist speed high/low	m/ min				
	(v) Cross travel speed	m/ min				
	(vi) Span	m				
(b)	**Hoisting Rope:**					
	(i) Diameter	mm				
	(ii) Construction					
	(iii) Quality of steel					
	(iv) Minimum Breaking Load	kgs				
	(v) Factor of safety					
(c)	**Motors for Hoist/ cross travel :**					
	(i) Make					
	(ii) Type					

S. No.	Description	Units	Particulars			
	(iii) Rating	kW				
(d)	**Details of Brakes for Hoist/cross travel:**					
	(i) Make					
	(ii) Design Holding Torque	N-mm				
	(iii) Net weight	kgs				

1.2.32 Manual Hoists

Sr. No.	Description	Particulars					
		Alum handling	**Primary Scum pumps**	**Primary Sludge Pump Room**	**Secondary Scum pumps**	**Plant Drain PS**	**Plant water PS**
(a)	Capacity (tonnes)						
(b)	Quantity						
(c)	Class						
(d)	Lift (m)						
(e)	Span (m)						
(f)	Length of the runway (m)						
(g)	Hook type / Construction						
	- I.S. Specifi						

Sr. No.	**Description**	**Particulars**					
		Alum handling	**Primary Scum pumps**	**Primary Sludge Pump Room**	**Secondary Scum pumps**	**Plant Drain PS**	**Plant water PS**
	cation No.						
	- Swivel type						
(h)	Wire rope construction and standard						
(i)	Specification/ Type of Rails for Long Travel						
(j)	**Painting**						
	- Type of primer coat						
	- No. of coats of paint						

Sr. No.	**Description**	**Particulars**					
		Gas Gen set	**Hot water Boilers**	**Poly dosing**	**Thickener Unit**	**Clarifiers**	**Centrifuge feed pump**
(a)	Capacity (tonnes)						
(b)	Quantity						
(c)	Class						
(d)	Lift (m)						
(e)	Span (m)						
(f)	Length of the runway (m)						
(g)	Hook type / Construction						
	- I.S. Specification No.						
	- Swivel type						
(h)	Wire rope construction and standard						
(i)	Specification/ Type of Rails for Long Travel						
(j)	**Painting**						

Sr. No.	Description	Particulars					
		Gas Gen set	**Hot water Boilers**	**Poly dosing**	**Thickener Unit**	**Clarifiers**	**Centrifuge feed pump**
	- Type of primer coat						
	- No. of coats of paint						

1.2.33 Submersible Pump Set

S. No.	Description		Units	Particulars		
				Thickener feed pumps	**Digester feed pumps**	**Digester recirculation pumps**
(a)	**Pump**					
	(i)	Pump Make				
	(ii)	Type				
	(iii)	Model				
	(iv)	Quantity (W+S)	Nos.			
	(v)	Capacity	m^3/s			
	(vi)	Head	mlc			
	(vii)	Shut off Head	metres			
	(viii)	NPSH required	metres			
	(ix)	Submergence required	metres			
	(x)	Efficiency	%			
	(xi)	Absorbed power at duty point	kW			

S. No.	Description		Units	Particulars		
				Thickener feed pumps	**Digester feed pumps**	**Digester recirculation pumps**
	(xii)	Motor rating	kW			
	(xiii)	Speed	rpm			
(b)	**Material of construction:**					
	(i)	Casing				
	(ii)	Impeller				
	(iii)	Shaft				
	(iv)	Mechanical Seal				
	(v)	Lifting Chain and Guide Bar				
	(vi)	Cooling Jacket				
	(vii)	Discharge size	mm			
	(viii)	Suction size	mm			
	(ix)	Flange Drilling standard:				
	(x)	Weight (Pump + Motor)	kgs			
(c)	**Testing & Inspection:**					
	(i)	Pump performance testing standard				
	(ii)	Maximum Noise level	dB(A)			
	(iii)	Maximum velocity of vibration	mm/sec			
(d)	**Motor :**					
	(i)	Make				
	(ii)	Type				
	(iii)	Model				
	(iv)	Quantity (W+S)				
	(v)	Rating	kW			

S. No.	Description		Units	Particulars		
				Thickener feed pumps	**Digester feed pumps**	**Digester recirculation pumps**
	(vi)	Weight	kgs			

S. No.	Description		Units	Particulars		
				Plant drain pumps	**Plant water pumps**	**Dewatering pumps**
(a)	**Pump**					
	(i)	Pump Make				
	(ii)	Type				
	(iii)	Model				
	(iv)	Quantity (W+S)	Nos.			
	(v)	Capacity	m^3/s			
	(vi)	Head	mlc			
	(vii)	Shut off Head	metres			
	(viii)	NPSH required	metres			
	(ix)	Submergence required	metres			
	(x)	Efficiency	%			
	(xi)	Absorbed power at duty point	kW			
	(xii)	Motor rating	kW			
	(xiii)	Speed	rpm			
(b)	**Material of construction:**					
	(i)	Casing				
	(ii)	Impeller				
	(iii)	Shaft				
	(iv)	Mechanical Seal				
	(v)	Lifting Chain and Guide Bar				
	(vi)	Cooling				

S. No.	Description		Units	Particulars		
				Plant drain pumps	**Plant water pumps**	**Dewatering pumps**
		Jacket				
	(vii)	Discharge size	mm			
	(viii)	Suction size	mm			
	(ix)	Flange Drilling standard:				
	(x)	Weight (Pump + Motor)	kgs			
(c)	**Testing & Inspection:**					
	(i)	Pump performance testing standard				
	(ii)	Maximum Noise level	dB(A)			
	(iii)	Maximum velocity of vibration	mm/sec			
(d)	**Motor :**					
	(i)	Make				
	(ii)	Type				
	(iii)	Model				
	(iv)	Quantity (W+S)				
	(v)	Rating	kW			
	(vi)	Weight	kgs			

1.2.34 Valves

S. No.	Description	Units	Particulars
(a)	**<u>Butterfly valves:#</u>**		
	(i) Make		
	(ii) Type		
	(iii) Model		
	(iv) Service		

S. No.	Description	Units	Particulars
	(v) Quantity (W+S)	Nos.	
	(vi) Size	mm	
	(vii) Rating	PN	
	(viii) Test pressure	bar	
	Material of construction		
	(ix) Body		
	(x) Disc		
	(xi) Sealing face		
	(xii) Shaft		
	Gear Reducers		
	(i) Make		
	(ii) Material		
	(iii) Flange Drilling standard		
(b)	**Butterfly Valve Actuators #**		
	(i) Make		
	(ii) Type		
	(iii) Model		
	(iv) Service		
	(v) Quantity (W+S)	Nos.	
	(vi) Motor rating	kW	
	(vii) Design Torque	N-m	
	(viii) Time for full open to full close	seconds	
(c)	**Plug valve**		
	(i) Make		
	(ii) Type		
	(iii) Model		
	(iv) Service		
	(v) Quantity (W+S)	Nos.	
	(vi) Size	mm	
	(vii) Rating	PN	
	(viii) Test pressure	bar	
	(ix) Body material		
(d)	**Non-return valves #**		
	(i) Make		
	(ii) Type		
	(iii) Model		
	(iv) Service		
	(v) Quantity (W+S)	Nos.	
	(vi) Size	mm	
	(vii) Rating	PN	

S. No.	Description	Units	Particulars
	(viii) Test Pressure	bar	
	(ix) Design standard		
	(x) Flange drilling standard		
(e)	**Material of construction:**		
	(i) Body		
	(ii) Disc/plates		
	(iii) Spring		
	(iv) Shaft		
(f)	**Sluice valves:#**		
	(i) Make		
	(ii) Type		
	(iii) Model		
	(iv) Service		
	(v) Number	Nos	
	(vi) Size	mm	
	(vii) Rating	PN	
	(viii) Test pressure	bar	
	Material of construction		
	(ix) Body		
	(x) Gate		
	(xi) Sealing face		
	(xii) Shaft		
	Gear Reducers		
	(i) Make		
	(ii) Material		
	(iii) Flange Drilling standard		
(g)	**Sluice Valve Actuators #**		
	(i) Make		
	(ii) Type		
	(iii) Number		
	(iv) Motor rating	kW	
	(v) Design Torque	N-m	
	(vi) Time for full open to full close	seconds	
(h)	**<u>Knife Gate valves:#</u>**		
	(i) Make		
	(ii) Type		
	(iii) Model		
	(iv) Service		
	(v) Number		
	(vi) Size	mm	

S. No.	Description	Units	Particulars
	(vii) Rating	PN	
	(viii) Test pressure	bar	
	(ix) Body material		
	(x) gate material		
	(xi) Sealing face material		
	(xii) Shaft material		
	(xiv) Gear Reducers:		
	(xv) Make		
	(xvi) Material		
	(xvii) Flange Drilling standard		
(i)	**Knife Gate Valve Actuators #**		
	(i) Make		
	(ii) Type		
	(iii) Number		
	(iv) Motor rating	kW	
	(v) Design Torque	kg-m	
	(vi) Time for full open to full close	seconds	
(j)	**Telescopic valve**		
	(i) Make		
	(ii) Quantity (W+S)	Nos.	
	(iii) Type		
	(iv) Pressure rating	PN	
	(v) Diameter /size	m	
	(vi) End connection		
	(vii) Material of construction:		
	(viii) Valve Body		
	(ix) Spindle		
	(x) Disc/gate		
	(xi) Lining		
	(xii) Fasteners		
k)	**Ball Valves**		
	(i) Make		
	(ii) Quantity (W+S)	Nos	
	(iii) Type		
	(iv) Pressure rating	Bar	
	(v) Diameter /size	Mm	

S. No.	Description	Units	Particulars
	(vi) End connection		
	Material of Construction		
	i) Stem		
	ii) Ball		
	iii) Seat		
	iv) Body		
	v) Fasteners		

Bidder to provide above details for each size, type of Valve and Service

1.2.35 Sludge Pumps

S. No.	Description		Units	Particulars	
				Primary Sludge Pumps	**Secondary Sludge Pumps**
(a)	(i)	Make			
	(ii)	Type			
	(iii)	Model			
	(iv)	Quantity (W+S)			
	(v)	Capacity	cum/ hr		
	(vi)	Head	mlc		
	(vii)	Efficiency	%		
	(viii)	Max.solid size	mm		
	(ix)	Speed	rpm		
	(x)	Motor rating	kW		
(b)	**Material of construction:**				
	(i)	Casing			
	(ii)	Rotor			
	(iii)	Stator			
	(iv)	Line shaft			
	(v)	Sealing			
	(vi)	Base Plate			
(c)	**Construction Features**				
	(i)	Protection			
	(ii)	Flange drilling standard			
	(iii)	Suction	mm		

S. No.	Description		Units	Particulars	
				Primary Sludge Pumps	**Secondary Sludge Pumps**
		diameter			
	(iv)	Discharge diameter	mm		
	(v)	Coupling type/make			
(d)	**Motor**				
	(i)	Make			
	(ii)	Motor rating	kW		
	(iii)	Motor speed	rpm		
	(v)	Insulation class			
	(vi)	Enclosure			
	(vii)	Voltage & Frequency			

1.2.36 Air-conditioning Equipment (For SCADA Room)

S. No.	Description		Units	Particulars
(a)	(i)	Make		
	(ii)	Model		
	(iii)	Type		
	(iv)	Capacity	TR	
	(v)	Quantity	Nos.	
	(vi)	Motor Rating	kW	
	(vii)	Air-Ducting:		
	(viii)	Material		
	(ix)	Size		
	(x)	Quantity		
	(xi)	Whether all the required accessories are provided	Yes/No	

1.2.37 Penstocks

Sr. No	Item		Unit	Description			
				Inlet	**Screen**	**Screen**	**Wet**

Sr. No	Item		Unit	Description			
				chamber-TSPS	**Inlet-TSPS**	**Outlet-TSPS**	**well & common wall**
(a)	(i)	Manufacturer					
	(ii)	Model					
	(iii)	Quantity					
	(iv)	Service					
	(v)	Type					
	(vi)	Spindle Type					
	(vii)	Size (Height x width)	mm				
	(viii)	Weight	Kgs				
	(ix)	Seating Head	Metre				
	(x)	Unseating Head	Metre				
(b)		**Material of construction:**					
	(i)	Wall Thimble					
	(ii)	Gate					
	(iii)	Frame					
	(iv)	Spindle					
	(v)	Stem coupling					
	(vi)	Seating face					
	(vii)	Wedge					
	(viii)	Headstock					
	(ix)	Gear House cover & stem guide					
	(x)	Lift Nut					
	(xi)	Fasteners & Anchors					
	(xii)	Lifting mechanism, Gear House & stem guide					
(c)	**Penstock Actuators +**						
	(i)	Manufacturer					
	(ii)	Type					
	(iii)	Model					

Sr. No	**Item**		**Unit**	**Description**			
	(iv)	Service					
	(v)	Number					
	(vi)	Motor Rating	kW				
	(vii)	Motor speed	rpm				
	(viii)	Protection					
	(ix)	Gear Reducer Make					
	(x)	Type					
		(+ Bidder to provide above details for each size of Penstock ,Actuator and Service)					

Sr. No	**Item**		**Unit**	**Description**					
				Stilling chamber-STP	**Fine screen inlet**	**Fine screen outlet**	**Grit chamber inlet**	**Grit chamber outlet**	**Distribution chamber -Primary clarifier**
(a)	(i)	Manufacturer							
	(ii)	Model							
	(iii)	Quantity							
	(iv)	Service							
	(v)	Type							
	(vi)	Spindle Type							
	(vii)	Size (Height x width)	mm						
	(viii)	Weight	Kgs						
	(ix)	Seating Head	Metre						
	(x)	Unseating Head	Metre						
(b)		**<u>Material of</u>**							

Sr. No	Item		Unit	Description					
		construction:							
	(i)	Wall Thimble							
	(ii)	Gate							
	(iii)	Frame							
	(iv)	Spindle							
	(v)	Stem coupling							
	(vi)	Seating face							
	(vii)	Wedge							
	(viii)	Headstock							
	(ix)	Gear House cover & stem guide							
	(x)	Lift Nut							
	(xi)	Fasteners & Anchors							
	(xii)	Lifting mechanism, Gear House & stem guide							
(c)	**Penstock Actuators +**								
	(i)	Manufacturer							
	(ii)	Type							
	(iii)	Model							
	(iv)	Service							
	(v)	Number							
	(vi)	Motor Rating	kW						
	(vii)	Motor speed	rpm						
	(viii	Protectio							

Sr. No	**Item**		**Unit**	**Description**					
	)	n							
	(ix)	Gear Reducer Make							
	(x)	Type							
		(+ Bidder to provide above details for each size of Penstock , Actuator and Service)							

Sr. No	**Item**		**Unit**	**Description**					
				Bio reactor inlet	**Distribution chamber - Secondary clarifier**	**Disc filter Inlet**	**CCT Inlet**	**Primary Clarifier-Bye pass**	**Bio reactor-Bye pass**
(a)	(i)	Manufacturer							
	(ii)	Model							
	(iii)	Quantity							
	(iv)	Service							
	(v)	Type							
	(vi)	Spindle Type							
	(vii)	Size (Height x width)	mm						
	(viii)	Weight	Kgs						
	(ix)	Seating Head	Metre						
	(x)	Unseating	Met						

Sr. No	**Item**		**Unit**	**Description**					
		Head	re						
(b)		**<u>Material of construction</u>:**							
	(i)	Wall Thimble							
	(ii)	Gate							
	(iii)	Frame							
	(iv)	Spindle							
	(v)	Stem coupling							
	(vi)	Seating face							
	(vii)	Wedge							
	(viii)	Headstock							
	(ix)	Gear House cover & stem guide							
	(x)	Lift Nut							
	(xi)	Fasteners & Anchors							
	(xii)	Lifting mechanism, Gear House & stem guide							
(c)	**Penstock Actuators +**								
	(i)	Manufacturer							
	(ii)	Type							
	(iii)	Model							
	(iv)	Service							
	(v)	Number							
	(vi)	Motor Rating	kW						

Sr. No	Item		Unit	Description					
	(vii)	Motor speed	rpm						
	(viii)	Protection							
	(ix)	Gear Reducer Make							
	(x)	Type							
		(+ Bidder to provide above details for each size of Penstock , Actuator and Service)							

1.2.38 Butterfly Valves

Sr. No.	Item		Unit	Description
(a)	**General**			
	(i)	Manufacturer		
	(ii)	Type		
	(iii)	Model		
	(iv)	Service		
	(v)	Quantity		
	(vi)	Size	mm	
	(vii)	Rating	bar	
	(viii)	Test pressure	bar	
	(ix)	Body material		
	(x)	Disc material		
	(xi)	Sealing face material		
	(xii)	Shaft material		
	(xiii)	Gear Reducers :		

Sr. No.	Item		Unit	Description
	(xiv)	Manufacturer		
	(xv)	Material		
	(xvi)	Flange Drilling standard		
(b)	**Valve Actuators**			
	(i)	Manufacturer		
	(ii)	Type		
	(iii)	Model		
	(iv)	Service		
	(v)	Quantity		
	(vi)	Motor rating	kW	
	(vii)	Design Torque	Kg-m	
	(viii)	Time for full open to full close	minutes	

1.2.39 Sluice valves

Sr. No.	Item		Unit	Description	
(a)	(i)	Manufacturer			
	(ii)	Type			
	(iii)	Model			
	(iv)	Service			
	(v)	Number	Nos.		
	(vi)	Size	mm		
	(vii)	Rating	bar		
	(viii)	Test pressure	bar		
	(ix)	Body material			
	(x)	gate material			
	(xi)	Sealing face material			
	(xii)	Shaft material			
	(xiii)	Gear Reducers			
	(xiv)	Manufacturer			
	(xv)	Material			

Sr. No.	Item		Unit	Description	
	(xvi)	Flange Drilling standard			
(b)		**Sluice Valve Actuators**			
	(i)	Manufacturer			
	(ii)	Type			
	(iii)	Number	Nos.		
	(iv)	Motor rating	kW		
	(v)	Design Torque	Kg-m		
	(vi)	Time for full open to full close	minutes		

1.2.40 Propeller Exhaust Fan

S. No	Description	Units	Particulars
(a)	**Fan**		
	(i) Make		
	(ii) Make		
	(iii) Model		
	(iv) Impeller diameter	mm	
	(v) Impeller speed	rpm	
	(vi) Capacity	cum/hr	
	(vii) Static pressure	mmlc	
	(viii) Shaft power	W	
	(ix) Fan total efficiency	%	
(b)	**Motor**		
	(i) Make		
	(ii) Rating	kW	
(c)	**Overall weight**	kg	

1.2.41 Digester System

Digester Mixing Blowers

S. No.	Description	Units	Particulars
	(i) Make		

(a)	(ii) Type		
	(iii) Quantity (W+S)	Nos.	
	(iv) Capacity at NTP	m^3/min	
	(v) Head	Mlc	
	(vi) Efficiency	%	
	(vii) Rated Speed	Rpm	
	(viii) Absorbed power	kW	
	(ix) Motor rating	kW	
	(x) Speed, motor	Rpm	
	(xi) Motor make		
	(xiii) Vibration	mm/sec	
	(xiv) Noise level at Duty Point in dB(A) at 1.86 m from the unit		
	(xvi) With Acoustic Hood	dB(A)	
	(xvii) Without Acoustic Hood	dB(A)	
	(xviii) Accessories		
	(xix) Safety Device		
(b)	**Material of construction:**		
	(i) Casing		
	(ii) Impeller/Lobes		
	(iii) Shaft		
	(iv) Common Base frame		
	(v) Orientation		
(c)	Acoustics Hood:		
	(i) Type		
	(ii) Material of Construction		
	(iii) Weight – Blower	Kgs	
	(iv) Maximum lifting weight	Kgs	
	(v) Dimensions (L x W x H)	m x m x m	
	(vi) Coupling Type		
	(vii) Make		
(d)	Outlet silencer		
	(i) Type		
	(ii) Make		
	(iii) Filter media		
	(iv) Mean air velocity	m/sec	
(e)	Noise reduction (mean) Air release valves		
	(i) Number		
	(ii) Diameter	Mm	
	(iii) Type		
	(iv) Set pressure	Bar	
	(v) Make		
(f)	Delivery non-return valves		
	(i) Number	Nos	
	(ii) Diameter	Mm	
	(iii) Type		
	(iv) Make		

(g)	Delivery isolation valves		
	(i) Number		
	(ii) Diameter	Mm	
	(iii) Type		
	(iv) Make		

Bio Gas Scrubbers

S. No.	Description	Units	Particulars
(a)	(i) Make		
	(ii) Model		
	(iii) Type		
	(iv) Capacity		
	(v) Quantity (W+S)		
(b)	Bio-Gas Blowers:		
	(i) Make		
	(ii) Model		
	(iii) Type		
	(iv) Capacity	Nm3/hr	
	(v) Discharge Pressure	Mbar	
	(vi) Efficiency	%	
	(vii) Speed, blower	Rpm	
	(viii) Absorbed power	kW	
	(ix) Motor rating	kW	
	(x) Speed, motor	Rpm	
	(xi) Motor make		
	(xii) Noise level at Duty Point in dB(A) at 1.86 m	dB(A)	
	(xiii) Vibration		
(c)	Material of construction:		
	(i) Casing		
	(ii) Impeller/Lobes		
	(iii) Shaft		
	(iv) Common Base frame		
(d)	Acoustics Hood:		
	(i) Type		
	(ii) Material of Construction		
	(iii) Weight – Blower		
	(iv) Maximum lifting weight		
	(v) Dimensions		
	(vi) Coupling Type		
	(vii) Make		
(e)	Scrubber Pumps :		
	(i) Make		
	(ii) Model		
	(iii) Type		
	(iv) Quantity (W+S)	Nos.	

	(v) Capacity	cum/hr	
	(vi) Head	Mlc	
	(vii) Material of Construction:		
	(viii) Body		
	(ix) Impeller		
	(x) Shaft		
	(xi) Base Frame		
	(xii) Motor		
	(xiii) Make		
	(xiv) Rating	kW	

Digester Heating-Heat Exchangers

S. No.	Description	Units	Particulars
(a)	(i) Make		
	(ii) Model		
	(iii) Type		
	(iv) Quantity (W+S)		
	(v) Heat Exchange capacity	Kcal/hr	
	(vi) Total area of Exchange	Sq.m.	
	(vii) Fluid Flow rate		
	(viii) Service Pressure		
	(ix) Connection size and rating	mm/bar	
	(x) Water Quality		
	(xi) Material Of construction		
	(xii) Tubes (inside/Outside)		
	(xiii) Support Skid		
	(xiv) Insulation		
	(xv) Type		
	(xvi) Protection		
	(xvii) Tube Thickness		
	(xviii) Skin Temperature		

Digester Heat Exchanger sludge circulation Pump Sets

S. No.	Description	Units	Particulars
(a)	(i) Make		
	(ii) Type		
	(iii) Model		
	(iv) Quantity (W+S)		
	(v) Capacity	l/s	
	(vi) Head	Mlc	
	(vii) Efficiency	%	
	(viii) Max. Solid size	Mm	
	(ix) Power absorbed	kW	

	(x) Speed	Rpm	
	(xi) Motor rating	kW	
	(xii) Motor Make		
(b)	Material of construction :		
	(i) Casing		
	(ii) Rotor		
	(iii) Stator		
	(iv) Line shaft		
	(v) Sealing		
	(vi) Base Plate		
	(vii) Flange drilling standard		
	(viii) Suction diameter	Mm	
	(ix) Discharge diameter	Mm	
	(x) Coupling type/make		

Heat Exchanger – Hot water circulation Pumps

S. No.	Description	Units	Particulars
(a)	(i) Make		
	(ii) Model		
	(iii) Type		
	(iv) Quantity (W+S)	Nos.	
	(v) Capacity	cum/hr	
	(vi) Head	Mlc	
	(vii) Efficiency	%	
	(viii) Power absorbed	kW	
	(ix) Speed	Rpm	
	(x) Impeller diameter	Mm	
	(xi) Impeller type		
(b)	**Material of construction:**		
	(i) Casing		
	(ii) Impeller		
	(iii) Shaft		
	(iv) Mechanical seal		
(c)	**Motor**		
	(i) Rating	Kw	
	(ii) Degree of Protection		
	(iii) Insulation Class		
	(iv) Speed	Rpm	
	(v) Efficiency		
	(vi) Voltage		

Gas Flare system

S. No.	Description	Units	Particulars
(a)	(i) Make		
	(ii) Model		

	(iii) Type		
	(iv) Capacity		
	(v) Quantity (W+S)		
	(vi) Height		
	(vii) Diameter		
	(viii) Material of Construction :		
	(ix) Frame		
	(x) Flame Tube		
	(xi) Combustion Chamber		

Digester Heating – Hot water Boiler

S. No.	Description	Units	Particulars
(a)	(i) Make		
	(ii) Model		
	(iii) Type		
	(iv) Quantity	Nos.	
	(v) Capacity (Heat output)	kcal/hr	
	(vi) Maximum working pressure	Kg/cm^2	
	(vii) Thermal Efficiency	%	
	(viii) Heating Area	Sq.mtrs	
	(ix) Hot water temperature range	^0C	
	(x) Hot Water flow rate (Design/Maximum)	Cum/hr	
	(xi) Inlet temperature/Outlet temperature	^0C	
	(xii) Gas Flow rate	Cum/hr	
	(xiii) Total connected load	kW	
	(xiv) Power supply	V/Hz	
	(xv) Material of Construction :		
	(a) Base Frame		
	(b) Helical coil		
	(c) Shell/combustion chamber		
	(d) Burner		
	(e) Jacket insulation		
	(f) Main Body insulation		
	(xi) Painting and protection		

1.2.42 Bio gas power generation System

S. No	Description	Units	Particulars
(a)	(i) Gas Engine Generation Set		
	(ii) Bio Gas Flare		
	(iii) Gas Scrubbing system		
	(iv) Gas collecting Blowers		
	(v) Gas Engine Feeding Blowers		
	(vi) Ancillaries		

1.2.43 Centrifuge and Thickener Building

Centrifuge Feed Pumps

S. No.	Description	Units	Particulars
(a)	(i) Make		
	(ii) Type		
	(iii) Model		
	(iv) Quantity (W+S)		
	(v) Capacity	l/s	
	(vi) Head	mlc	
	(vii) Efficiency	%	
	(viii) Max. Solid size	mm	
	(ix) Power absorbed	kW	
	(x) Speed	rpm	
	(xi) Motor rating	kW	
	(xii) Motor Make		
(b)	**Material of construction**		
	(i) Casing		
	(ii) Rotor		
	(iii) Stator		
	(iv) Line shaft		
	(v) Sealing		
	(vi) Base Plate		
(c)	**Construction Features**		
	(i) Flange drilling standard		
	(ii) Suction diameter	mm	
	(iii) Discharge diameter	mm	
	(iv) Coupling type/make		

Dewatering Centrifuge

S. No.	Description	Units	Particulars
(a)	(i) Make		
	(ii) Type		
	(iii) Model		
	(iv) Quantity (W+S)	No.s	
	(v) Feed rate per centrifuge	cum/hr	
	(vi) Mass feed rate		
	(vii) % dried solids		
	(viii) Noise level (dBA) at 1m distance from the machine	dB(A)	
	(ix) Vibration level		
	(xi) Bowl Diameter	mm	
	(xiii) Bowl length	mm	
	(xiv) Taper Angle	degrees	
	(xv) Bowl speed	rpm	
	(xvi) Centrifugal force	Kgf	
	(xvii) Gear Box ratio		
	(xviii) Overall Dimension	mm	
	(xix) Weight (Centrifuge + Motor)	kgs	
	(xx) Protection of centrifuge		
(b)	**Material of Construction:**		
	(i) Bowl		
	(ii) Scroll		
	(iii) Blade		
	(iv) Scroll lead face protection		
	(v) Casing-Upper & Lower		
	(vi) Wear protection		
(c)	**Motor :- Main Drive**		
	(i) Make		
	(ii) Motor rating(Main Drive)	kW	
	(iii) Motor speed	rpm	
	(iv) Make of Motor		
	(v) Insulation class		
	(vi) Enclosure		
	(vii) Voltage & Frequency		
(d)	**Motor -Back drive**		
	(i) Make		
	(ii) Motor rating	kW	
	(iii) Motor speed	rpm	
	(iv) Make of Motor		
	(v) Insulation class		
	(vi) Enclosure		
	(vii) Voltage & Frequency		

Cake Hopper

S. No.	Description	Units	Particulars
(a)	(i) Make		
	(ii) Model		
	(iii) Type		
	(iv) Capacity	Kgs/min.	
	(v) Dimensions	mxm	
	(vi) Material of Construction		
(b)	**Motor**		
	(i) Make		
	(ii) Rating	kW	
	(iii) Speed	rpm	
	(iv) Insulation class		
	(v) Enclosure		
	(vi) Voltage & Frequency		

Belt Conveyor

S. No.	Description	Units	Particulars
(a)	(i) Make		
	(ii) Model		
	(iii) Type		
	(iv) Quantity (W+S)	nos	
	(v) Capacity	Kgs/min.	
	(vi) Length of conveyor	m	
	(vii) Angle of Inclination		
	(viii) Belt width	mm	
	(ix) Jointing detail/type		
	(x) Belt rating		
	(xi) Belt speed		
	(xiii) Belt scraper-Type / No.		
(b)	**Motor**		
	(i) Make	`	
	(ii) Rating	kW	
	(iii) Speed	rpm	
	(iv) Insulation class		
	(v) Enclosure		
	(vi) Voltage & Frequency		

Note: All Equipment shall be make as per Bid requirements and any alternate make shall qualify the alternate make criteria clause in the bid document.

3.3 Process and CIVIL Units

S. No.	Units	STP
3.3.1	**Sewage Treatment Plant**	
(a)		
	Fine Screen Influent Channel	
	(i) Size of channel, L*B*D (m)	
	(ii) Size of incoming pumping main (m)	
	(iii) No. and size of gated openings weir gates	
	(iv) Max, Average, and Min water levels (m)	
	Fine Screen Channels	
	(i) No. of units	
	(ii) Capacity of each unit (MLD)	
	(iii) Size of channel, L*B*D (m)	
	(iv) Max, Average, and Min water levels (m)	
	(v) Head loss (m)	
	Fine Screen Effluent/ Grit Basin Distribution Channel	
	(i) Size of channel L*B*D (m)	
	(ii) No. and size of gated openings and type of gates – Screen Effluent	
	(iii) No. and size of gated openings and weir gates – Grit Basin Influent	
	(iv) Max, Average, and Min water levels m)	
	Grit Basins	
	(i) Particle size to be removed (mm)	
	(ii) Specific gravity	
	(iii) Efficiency of removal (%)	
	(iv) Size of grit basin influent structure (m)	
	(v) Grit Basins - Number - Capacity, each MLD Size, each, L*B*D (m)	
	(vi) Surface overflow rate (m^3/m^2/day)	
	(vii) Max, Average, and Min water levels in grit chamber m)	
	Grit Basin Effluent Channel	
	(i) Size of channel (m)	

S. No.	Units	STP
	(ii) No. and size of gated openings and type of gates	
	(iii) Max, Average, and Min water levels (m)	
	(iv) Size of Bypass channel/pipe (m), Material of Construction	
(b)	Primary Sedimentation Tank Distribution Structure	
	- Size of inlet channel - No. of branches - Size of each branch, L*B*D (m) - Size of weir gates (m)	
(c)	Primary Sedimentation	
	- No. of Tanks - Capacity, each MLD - Length (m) - Surface area each (m^2) - HRT (Hrs) - Side water depth (m) - Surface overflow rate ($m^3/m^2/hr$) - Bottom floor slope - Inlet Pipe Diameter (From distribution structure) (mm)	
(d)	Primary Sludge Pumping Station	
	- Pump station building size, L*B*H (m) - All building slab elevations (m) - Dia. (mm) and length (m) of rising main	
(e)	Primary Scum Pumping Station	
	- Pump station building size, L*B*H (m) - All building slab elevations (m) - Dia. (mm) and length (m) of rising main	
(f)	Pipeline from PST to Distribution chamber of Bioreactor with drop manhole chamber	
	- Dia. of pipeline - Material - Dia. of Drop manhole	
(g)	Bioreactor Tank Distribution Structure	

S. No.	Units	STP
	- Size of inlet channel - No. of branches - Size of each branch, L*B*D (m) - Size of weir gates (m)	
(h)	Aeration Basin Influent Channel	
	- Size of channel - No. of distribution branches - Size of each branch, L*B*D (m) - No. and size of gated openings and weir gates (m) - Size of Bypass channel/pipe (m), Material of Construction - Max, Average, and Min water levels (m)	
(i)	Aeration Basins	
	(i) - No. of basins - Length-to-width ratio for each basin	
	(ii) Process info - Total volume (m^3) - Total HRT (Hrs) - Total SRT (days) - Anaerobic SRT (days) - Anoxic SRT (days) - Aerobic SRT (days) - Overall Length and Width for all basins (m) - Overall F/M ratio (Kg BOD removed/ Kg MLVSS/ day) - Mixed Liquor Recycle (MLR) ratio - MLR “From” and “To” locations - Return Activated Sludge (RAS) ratio - RAS “From” and “To” locations	

S. No.	Units	STP
	(iii) Anaerobic Zones - No. of zones per basin - Volume per basin (m^3) - Total anaerobic volume (m^3) - Anaerobic volume as fraction of total volume - Side-Water Depth (SWD) (m) - Anaerobic MLSS (mg/l) - Anaerobic MLVSS (mg/l)	
	(iv) Anoxic Zones - No. of zones per basin - Volume per basin (m^3) - Total Anoxic volume (m^3) - Anoxic volume as fraction of total volume - Side-Water Depth (SWD) (m) - Anoxic MLSS (mg/l) - Anoxic MLVSS (mg/l)	
	(v) Aerobic Zones - No. of zones per basin - Volume per basin (m^3) - Total Aerobic volume (m^3) - Aerobic length-to-width ratio for each basin - Aerobic volume as fraction of total volume - Side-Water Depth (SWD) (m) - Aerobic MLSS (mg/l) - Aerobic MLVSS (mg/l)	
	(vi) Hydraulic info - Aeration basin internal baffle weir elevations (m) - Max, Average, and Min water levels in all zones (m)	
(j)	Aeration Basin Effluent Channel	
	- Size of channel, L*B*D (m) No. and size of gated openings and weir gates (m)	

S. No.	Units	STP
(k)	Secondary Sludge Pumping Station	
	- Pump station building size, L*B*H (m) - All building slab elevations (m) - Dia. (mm) and length (m) of rising main	
(l)	Secondary Scum Pumping Station	
	- Pump station building size, L*B*H (m) - All building slab elevations (m) - Dia. (mm) and length (m) of rising main	
(m)	Process Air Blower Building/ (i) Inside dimensions of blower room (Length x Width) (m) (ii) Inside dimensions of panel room (Length x Width) (m) (iii) Area allocated for loading / unloading (m^2) Height of Building (m)	
(n)	Final Sedimentation Distribution Structure - No. of branches - Size of each branch box L*B*D (m) - Type of arrangement for equal dist. of flow - No. and size of gated openings and weir gates (m)	
(o)	Secondary Sedimentation Tanks	

S. No.	Units	STP
	- No. of Tanks - Capacity, each (MLD) - Length, each (m) - Surface area each (m^2) - Total HRT (Hrs) - Side water depth (m) - Surface overflow rate at average flow ($m^3/m^2/day$) - Surface overflow rate at peak flow ($m^3/m^2/day$) - Solids loading rate at average flow ($Kg/m^2/day$) - Bottom floor slope - Diameter of Inlet Pipe (From distribution structure to Centre column (mm) - Diameter of centre column (mm)	
(p)	Chlorine Contact Tank Influent Channel - Size of channel - No. and size of gated openings and weir gates (m) - Size of bypass channel/pipe (m), Material of Construction	
(q)	Chlorine Contact Tank(s)	
	(i) Number of tanks	
	(ii) Volume of each tank (m^3)	
	(iii) Total hydraulic retention time (all tanks) at peak flow (min.)	
	(iv) Overall Length and Width of all tanks (m)	
	(v) No. of passes per tank	
	(vi) Pass width (m)	
	(vii) Max, Average, and Min water depth (m)	
	(viii) Total length of travel of liquid per tank (m)	
	(ix) Effective length-to-width ratio	
(r)	Chlorine Contact Tank Effluent Channel	

S. No.	Units	STP
	- Size of channel (m) - No. and size of gated openings and weirs or gates (m) - Length and size, invert level of final effluent pipe/conduit to disposal point (m)	
(s)	Chlorination Building (i) Inside dimensions of chlorinator room (m) (ii) Inside dimensions of chlorine tonner room (m) Area allocated for loading / unloading (m2) (iii) Height of Building (m) (iv) Scrubbing system Area	
(t)	Chemical Building-Alum (i) Inside dimensions of alum storage room (m) (ii) Inside dimensions of slum solution tank room (m) Area allocated for loading / unloading (m2) (iii) Height of Building (m)	
(u)	Mechanical Thickener Building (i) Inside dimensions of Feed sump (m) (ii) Inside dimensions of thickener room (m) (iii) Height of Building (m)	
(v)	Chemical Building-Poly (i) Inside dimensions of poly storage room (m) (ii) Inside dimensions of poly solution tank room (m) Area allocated for loading / unloading (m2) (iii) Height of Building (m)	

S. No.	Units	STP
(w)	Dewatering centrifuge Building (i) Inside dimensions of Feed sump (m) (ii) Inside dimensions of thickener room (m) (iii) Height of Building (m)	
(x)	Anaerobic Sludge Digester(s) Type/Shape No. of units Full inside dimensions, each (m) SRT (days) Side water depth (m) Bottom floor slope Diameter (mm) and length (m) of inlet and outlet pipes	
(y)	Digested Sludge/Biogas Storage Tank(s) Type/Shape No. of units Full inside dimensions, each (m) Sludge HRT (days) Gas HRT (hours) Side water depth (m) Bottom floor slope Diameter (mm) and length (m) of inlet and outlet pipes	
(z)	Digester Building	
	(i) Building inside dimensions, L*B(m)	
	(ii) Height of Building (m)	
	(iii) All building slab elevations (m)	
	(iv) Dimensions of all internal areas and spaces within building (m)	
(aa)	Boiler Building	
	(i) Building inside dimensions, L*B (m)	
	(ii) Height of Building (m)	
	(iii) All building slab elevations (m)	

S. No.	Units	STP
	(iv) Dimensions of all internal areas and spaces within building (m)	
(ab)	Biogas Generation Set Building	
	Inside dimensions of biogas engine generator room (m) Inside dimensions of panel room (m)	
(ac)	Biogas Scrubbing System	
	Biogas scrubber package system concrete slab dimensions (m)	
(ad)	Disc Filter	
	- Type/Make - No. of Units - Blower Capacity - Other details to be furnished - No. of Disc - Effective area - Submerged effective area	
(ae)	Plant Drain Pumping Station	
	Full dimensions of structure (m)	
	All structural slab elevations (m)	
	Dia. (mm) and length (m) of rising main	
(af)	Plant Water Pumping Station	
	(i) Full dimensions of structure (m)	
	(ii) All structural slab elevations (m)	
	(iii) Dia. (mm) and length (m) of rising main	
(ag)	Administration cum Laboratory Building	

S. No.	Units	STP
	(i) Inside Dimensions of building (m x m) (ii) Inside Dimensions of office room (m x m) (iii) Inside Dimensions of SCADA room (m x (iv) m) (v) Inside Dimensions of laboratory room (m (vi) x m) (vii) Inside Dimensions of conference hall (m x (viii) m) (ix) Inside Dimensions of administrative room (x) (m x m) (xi) Inside Dimensions of store room (m x m) Inside Dimensions of Pantry/Kitchen (m x m) Inside Dimensions of Toilet (m x m) Inside Dimensions of other room if any (m x m) Height of Building (m)	
(ah)	Maintenance Workshop/ Store room	
	(i) Inside Dimensions of Maintenance Workshop/Store room (m x m)	
	(ii) Height of Building (m)	
(ai)	Size of DG set room (m x m x m)	
(aj)	Size of Switch Gear room (m x m x m)	
(ak)	Area allocated for transformer yard (m^2)	
(al)	No. and Size of MCC rooms (m x m x m)	
	Width and Height of entrance gate (m) and wicket gate (m) with arrangement for cow guard	
(am)	Size of security shed (m x m x m)	
(an)	Area allocated for green belt (m^2)	
(ao)	Area allocated for two wheeler and four wheeler parking (m^2)	
(ap)	Width and length of approach road to site (m)	
(aq)	Width and length of roads inside the plant (m)	
(ar)	Internal drainage, water supply, and waste water disposal	

S. No.	Units	STP
	(i) No. and Size of bore/tube well (mm)	
	(ii) Storm water drain provision (size, length in m)	
	(iii) Water Supply and Sewerage Provision (Yes/No) - Capacity and size of water storage tank (m^3) - Capacity and size of overhead tank (m^3) - Capacity and size of septic tank (if required) (m^3)	
	(iv) Nos. and size of Culverts, road crossing, etc.	
(as)	Reclamation / Site Development – If Applicable	
	(i) Proposed area of Reclamation (m^2)	
	(ii) Top levels after Reclamation (m)	
	(iii) Average depth of filling (m)	
	(iv) Total quantity of earth required (m^3)	
	(v) Side slope of the filling	
	(vi) Slope protection measures	
	(vii) Proposed compaction equipment to be deployed (Type and No.)	
	(viii) Test apparatus to be provided in field soil laboratory	
	(ix) Proposed open channel dimension - Top width (m) - Bottom width (m) - Side slope - Longitudinal slope - Length (m)	
	(x) Bottom slope protection for open channel	
	(xi) Proposed equipment (type and number) for excavation, handling, transporting	
	(xii) Borrow pit - Name of the Location (s) - Area (m^2) - Type of soil in general	

S. No.	Units	STP
(at)	Miscellaneous	
	The Bidder shall list here details of any other / additional items required for a complete installation.	

3.3.2	Terminal Sewage Pumping Stations (TSPS)	TSPS
(a)	Diameter and Height of inlet manhole	
(b)	Coarse Screen Influent Channel	
	(i) Size of inlet channel (m)	
	(ii) Size of incoming sewer (m)	
	(iii) Nos. and size of gated openings and type of gates	
	(iv) Max, Average, and Min water levels (m)	
(c)	Coarse Screen Channels	
	(i) No. of units	
	(ii) Capacity of each unit in MLD	
	(iii) Size of channe,l L*B*D (m)	
	(iv) Clear opening of bars in screen at screen channel	
	(v) Max, Average, and Min water levels (m)	
	(vi) Head loss (mm)	
(d)	Coarse Screen Effluent Channel	
	(i) Size of inlet channel (m)	
	(ii) Nos. and size of gated openings and type of gates	
	(iii) Max, Average, and Min water levels (m)	
	(iv) Size of Plant Bypass	
(e)	TSPS Wet Well inside dimensions and bottom slab invert elevation, all in meters	
(f)	TSPS Valve Chamber inside	

	dimensions and bottom slab invert elevation, all in meters	
(g)	TSPS Superstructure dimensions (L/W/Dia, roof height) in meters	
(h)	Size of 11 KV Switch Gear room (m x m x m)	
(i)	Area allocated for transformer yard and 11 KV two pole structure (m2)	

Note: 1) Sizes of units shall mean Length x Width x Depth/Height as applicable and shall be expressed in "metres" unless otherwise stated.

2) Bidder shall furnish details in above table and write "NIL" wherever not applicable to the respective plant depending upon the process.

3) For New Technologies proposed by Bidder for which details are not available in the above table. Separate annexure in the same format shall be submitted.